

META-ANALYSIS OF THE EFFECTS OF FORMALDEHYDE EXPOSURE ON THE RISK OF SPONTANEOUS ABORTION

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Background and Aims: We reviewed the evidence supporting an association between formaldehyde exposure and increased risks of spontaneous abortion or miscarriage. Several reports of adverse reproductive effects have been associated with formaldehyde exposure in humans and animals. An earlier meta-analysis reported non-significant increased summary risks based on maternal and paternal exposures (Collins et al., 2001). The aim of the current meta-analysis is to update the earlier effort with focus solely on maternal exposures.

Methods: We systematically reviewed the epidemiologic literature on the relationship between formaldehyde exposures and spontaneous abortions in humans. We selected to review six research articles concerning 3,233 women (528 with spontaneous abortion) which contain information suitable for meta-regression analysis. Pooled ORs and 95% CIs were obtained using fixed-effects and random-effects models with inverse variance weights. We tested heterogeneity using Cochrane's homogeneity statistic and quantified with the Q statistic. The potential for publication bias was assessed using the p-values from each of the included studies to compute the number of potentially unpublished studies with non-significant findings which would be necessary to change the meta-regression conclusions.

Results: While there was some heterogeneity in the reported results, it was not statistically significant ($Q=10.95$; $p=0.0523$). A fixed-effects model, which did not account for variation among the 6 studies, indicated the OR value of 1.95 for exposed women compared to unexposed (95%CI: 1.43-2.65). A random-effects model, which did account for variation among the studies, indicated the OR value of 1.91 for exposed women compared to unexposed (95%CI: 1.18-3.10).

Conclusions: Our updated meta-analysis supports the conclusion that formaldehyde exposure may increase the risk of spontaneous abortion among women. We computed that more than 25 additional unpublished studies with non-significant results would be necessary to change this conclusion.

Disclaimer: This abstract does not necessarily reflect EPA policy.

References:

Collins JJ, Ness R, Tyl RW, Krivanek N, Esmen NA, Hall TA. A Review of Adverse Pregnancy Outcomes and Formaldehyde Exposure in Human and Animal Studies. *Reg Tox Pharmacol* 2001;34:17-34.